



## **Shielding Gases. Are You Welding with a Shielding Gas that conforms to AWS Specification A5.32?**

Welding with the Right Shielding Gas..... Every time!

In today's manufacturing environment, quality and consistency are key requirements of any quality assurance program. Whether your goal is ISO certification or maintaining your own internal quality program, you must be confident that: A) your processes are consistent and repeatable, and B) the products being used in production meet specific requirements, and specifications.

In order to maintain a stable consistent welding process, and assure repeatable results, welding procedure specifications (WPS's) are implemented. These procedure specifications give the welder or welding operator the recipe to produce acceptable welds on a given application time after time. In developing a WPS for gas metal arc welding (GMAW) or gas tungsten arc welding (GTAW), there are many variables which must be taken into account such as voltage, amperage, electrical stick-out, and shielding gas, these variables and others are called essential variables as defined in AWS D1.1, Structural Welding Code.

With respect to shielding gases AWS D1.1 states the following: A procedure qualification record (PQR) requires requalification when "A change in shielding gas from a single gas to any other single gas or mixture of gas, or in the specified nominal percentage composition of a gas mixture, or to no gas". Therefore it is essential that your shielding gas composition be accurate and consistent, in order to insure your WPS's are being followed and that you maintain your desired weld quality.

In order to insure that your shielding gas supply is accurate and consistent, it is important that your shielding gases conform to AWS specification A5.32, and this responsibility lies with your gas supplier.

AWS A5.32 "Specification for Welding Shielding Gases", prescribes the requirements for the classification of shielding gases, similar to the way AWS 5.18 "Specification for Carbon Steel Electrodes and Rods for Gas Metal Arc Welding", prescribes a classification system for identifying carbon steel electrodes and rods. These specifications were developed by the AWS and approved by ANSI to provide a means of identifying products based on chemical composition. When these specifications are utilized and implemented by the manufacturer of each product, the end user is assured a consistent quality product.

The classification system outlined in the AWS A5.32 is a system that clearly identifies the chemical composition of the shielding gas in question, similar to the way in which welding wire is identified. To make an analogy: If you order E70S-6 welding wire you should feel confident that you will receive a welding wire that contains a certain percentage of silicon, manganese, and so on. Similarly, when you order a shielding gas you should be confident that when you order SG-AC-10, that product should be 10% carbon dioxide, 90% argon, and that the product is consistent from cylinder to cylinder.

AWS A5.32 not only establishes an identification system for shielding gases, it also specifies purity and dew point levels that are required for individual gases which are shown in *table X*. Requirements for dew point, purity, and mix accuracy of gas mixtures is also covered in the specification. In order to adhere to this specification your shielding gas supplier is required to test individually filled cylinders or one cylinder from each filling manifold to verify mix accuracy, purity and dew point.

To insure that your gases comply with AWS specification A5.32, look on the cylinder, if your gases are meeting this specification they should be labeled as such and have a label similar to that seen in diagram X. If your shielding gas cylinder has label similar to this, you can be assured that your gas supplier is taking all the necessary precautions to supply your company with consistent, quality gas mixtures.

**Table 1**  
**Gas Type, Purity, and Dew Point Requirements for Shielding Gas Components**

Gas	AWS Classification	Product State	Minimum Purity (%)	Maximum Moisture <sup>a</sup> (ppm)	Dew Point Maximum Moisture at 1 Atmosphere		CGA Class
					°F	°C	
Argon	SG-A	Gas	99.997	10.5	-76	-60	Type I G-11.1 Grade C
		Liquid	99.997	10.5	-76	-60	Type II G-11.1 Grade C
Carbon Dioxide	SG-C	Gas	99.8	32	-60	-51	G-6.2 Grade H
		Liquid	99.8	32	-60	-51	G-6.2 Grade H
Helium	SG-He	Gas	99.995	15	-71	-57	Type I G-9.1 Grade L
		Liquid	99.995 <sup>b</sup>	15	-71	-57	Type II G-9.1 Grade L
Hydrogen	SG-H	Gas	99.95	32	-60	-51	Type I G-5.3 Grade B
		Liquid	99.995 <sup>c</sup>	32	-60	-51	Type II G-5.3 Grade A
Nitrogen	SG-N	Gas	99.9	32	-60	-51	Type I G-10.1 Grade F
		Liquid	99.998	4	-90	-68	Type II G-10.1 Grade L
Oxygen	SG-O	Gas	99.5	Not Applicable	-54	-48	Type I G-4.3 Grade B
		Liquid	99.5	Not Applicable	-82	-63	Type II G-4.3 Grade B

Notes:  
a. Moisture specifications are guaranteed at full cylinder pressure, at which the cylinder is analyzed.  
b. Including neon.  
c. Including helium.

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Diagram 1

**This product conforms to AWS A5.32, classified  
as SG-AC-25**

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